The Hygiene of the Mouth.

R. Denison Pedley.

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A GUIDE TO THE

Prevention and Control of Dental Diseases.

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PREVENTION AND CONTROL

OF DENTAL DISEASES.

BY

R. DENISON PEDLEY, F.R.C.S. Ed.,
L.D.S. Eng.

Dental Surgeon to the Evelina Hospital for Sick Children, Southwark, London.

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PREFACE.

That dental diseases are widely prevalent, that they are the sources of much misery, and have serious effects upon the general health from early life to mature age, I have endeavoured to prove in the following pages. My other object has been to show clearly how such diseases may be controlled, and in a large measure prevented.

The first chapter, which has already appeared in my book on "The Diseases of Children's Teeth," has been revised, and more facts have been added. The chapter on Oral Hygiene *in Adults*, with the illustrations which accompany it, is now published for the first time.

RICHARD DENISON PEDLEY.

17, Railway Approach,
London Bridge, S.E.

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The Hygiene of the Mouth.

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IN CHILDREN.

Many are the theories suggested in order to account for the contributory or more remote causes of decay in teeth, such as an advanced civilization, with the accompaniment of overcrowding in our cities, the continuous nervous strain with the ever-increasing struggle of life, the alteration of food with its methods of preparation which give less work for the jaws or a general deterioration of tissue. Whatever opinions may be held on these points there are well-established facts which show that to micro-organisms is due the immediate or rather the direct destruction of the teeth.

Dental caries always commences from the outside. Food and its *débris* allowed to remain on or between the teeth undergo acid fermentation due to bacteria, and when, by means of these acids, lime salts are dissolved out of the

teeth, bacteria find an excellent pabulum upon which to work. At a later stage disintegration and destruction of the tissues follow with the concomitant evils of exposed pulp, &c.

In dental, as in other diseases, the clear recognition of causation is the surest guide to rational treatment, and in this respect the dental surgeon is not slow to avail himself of every aid to his art.

We must look, however, to preventive measures for the amelioration of a large amount of unnecessary suffering, the result of dental disease.

Personal cleanliness is recognised as a valuable aid, both in the treatment and prevention of many diseases. It is, nevertheless a curious fact, that in very few works on medicine is mention made of the necessity for keeping the mouth in a healthy condition during childhood, though careful directions are given as to personal hygiene, from infancy onward, of other parts of the body. Yet we have in dental caries a disease which is wider spread among children than any other disorders which can be mentioned. It attacks the rich as well as the poor, those who are surrounded by the

comfort and the necessities of a healthy existence, such as pure air, efficient sanitation and excellent food, and also those who eke out a miserable existence in the streets and courts of our towns.

While the educated among all classes of the community are very well aware of the necessity and the comfort of personal cleanliness, the utmost ignorance prevails as to the need of keeping the mouths of children in a healthy condition in order to prevent the decay of teeth.

The constant reply to the question, "Is this child taught to clean its teeth?" is "I did not think the first teeth required cleaning," or, "Yes! always *in the morning*."

There can be very little doubt that the friction of the food and the use of the tongue, should with a copious flow of saliva, be sufficient to effectually cleanse the teeth, but there are other important factors concerned which must not be lost sight of. Children receive little or no encouragement to masticate for the sake of the proper development of their jaws and teeth. The ceaseless activity of the young is as clearly shown in the desire to use the

muscles of mastication as the muscles of locomotion, and directly a child has teeth so soon will it be nibbling, and (if allowed) masticating every substance within reach.

Instead of encouraging this natural habit by giving the child hard biscuits of wholesome material, at suitable times, with other foods which require chewing, a tender solicitude for the child's welfare prompts both parents and nurse to provide material of soft consistency, so that the young stomach may receive food which they consider easy of digestion; and in order to suppress a suspicion of vulgarity, the larger bones which would afford both nourishment and exercise are carefully removed and given to the dog. The selection of foods which can most easily be digested, does not end with the children, it affects the parents who seek the same for themselves, being ignorant of the fact that even the muscular coats of the stomach require a reasonable amount of exercise.

The number of food stuffs offered to the public having the same undesirable end in view, adds to the indictment. This may give the idea to some future generation that we

were either a race of invalids, or, if healthy, as wise as he who would ride *always* in a carriage in order to develop his legs.

Thus by precept, and example, children are early led to acquire a taste for the softest food, and to avoid meat when it is tough, or bread when it is crusty or stale. They often seek relief from such opportunities for exercise, by indiscriminate drinking before the mouth is empty, preventing both teeth and saliva from performing their proper physiological functions.

Another important consideration is the slow but very marked decrease in the size of the jaws which is believed to be in progress. If the teeth followed suit it would be less serious, but the constant overcrowding of teeth among young adults, is the best evidence we have to the contrary. An overcrowded condition of the teeth leads to portions of food being lodged in such positions, that it is neither possible for the tongue to remove, nor the fluid taken to wash away such accumulations.

The proper use of the muscles of mastication, with the pressure exerted on the teeth by the grinding of food increases the supply of blood

to both jaws and teeth, and thus favours their growth and development of the permanent teeth which lie buried in the jaws.

It is necessary to remember that digestion in the alimentary canal commences with the entrance of food to the mouth, by the action of saliva in converting starch into sugar. That this may be accomplished the food should be thoroughly masticated and incorporated with the saliva until it becomes a pulpy mass, before being passed on to the coats of the stomach for further digestion.

The efficient and careful cleansing of the teeth of the young should be commenced as soon as there are teeth through the gums. This will be about the 7th or 9th month, and at such an age, a smooth piece of wet flannel or the corner of a towel can be used by the nurse to wipe away any particles of food. Later, when the child is capable of using a toothbrush this should be allowed. At first only water with the toothbrush is necessary; when, however, a child has sufficiently advanced to spit out water instead of swallowing it, the toothbrush may be previously rubbed on a piece of curd soap. Later still, precipitated chalk should be

added. The toothbrush should then be moistened, rubbed on the soap, and afterwards dipped in the powder. The teeth must be cleansed all over. The labial surfaces are to be brushed not only from side to side, but up and down, *i.e.*, the motion should be vertical as well as horizontal, in order that food may be removed from *between* the teeth. This may seem of trivial importance, but a simple diagram will show that the arches made by the

FIGURE 1.

The bristles of the tooth-brush passing *horizontally* over the convex contours of the teeth fail to sweep out the interstices.

teeth have many recesses which are all resting places for food, and brushing from side to side alone does not always reach them. The soap will remove the mucous secretion which exudes from the gums, and the impalpable chalk gives substance for cleaning the polished surface of enamel Both are alkaline and serve to check fermentation.

Cleansing the mouth should be performed

after every meal with the same regularity with which the child has a daily bath and washing of the face and hands. Especially is the tooth toilet necessary after the last meal of the day, because more mischief is done in the night while the tongue and jaws are at rest than at any other period. This is an obvious fact, notwithstanding the popular impression that a brush round in the morning is all that is necessary, even among those who are in the habit of cleansing the teeth.

The habit of giving bread or other starchy food to a child when in bed at night should be entirely prohibited. Many believe that sugar injures the teeth by inducing caries, and therefore sweets are debarred. It may be well to remind the reader that the ferment of saliva, known as ptyaline, converts starch into sugar. This sugar is acted upon by the bacteria of the mouth, producing lactic acid. Miller states* as the result of his wide experience and experimental researches, "I consider starch and amylaceous substances more detrimental to the teeth than sugar, particularly as sugar, being

* The Micro-organisms of the Human Mouth. p. 207.

readily soluble, is soon carried away or so diluted with the saliva as to be rendered harmless, whereas amylaceous matter adheres to the teeth for a greater length of time, and consequently manifests a more continued action than sugar."

This statement accords with our own experience, especially among the poor in the Hospital, where children of two and three years of age are found with scarcely a sound tooth, and the teeth, or what remains of them, coated with the remnants of bread or biscuits. This material nearly always gives an acid reaction when tested with litmus paper.

To deprive children of wholesome sweets at suitable times in order to preserve their teeth is a mistaken idea. It also deprives them of nourishment, for it is well known that sugar is an important food.

A quill toothpick should always be at the service of a child to remove stray particles of food jammed between the teeth. Metal or wooden toothpicks should be avoided, they are apt to injure the enamel or wound the gum.

In answer to the question, "Why should temporary teeth be taken so much care of?"

it is necessary to point out that the temporary teeth serve the purposes of mastication during a most important period of a child's existence. Carious temporary teeth often spoil their successors, or frequently interfere with their eruption. There are other reasons which will be spoken of later, but not the least important fact is that when the *débris* of food is removed, caries cannot take place, as without it (in a healthy mouth) there is no material for acid fermentation, and therefore no softening of dental tissue. Such a habit of cleanliness early impressed both by precept and example is seldom lost through life, and a child will be as uncomfortable later on in years when his teeth remain uncleansed as when he is unwashed.

So far we have considered the Hygiene of the Mouth in the home, and here the General Practitioner, consulted on all matters which concern the welfare of a child from its earliest infancy, has the opportunity of endeavouring to prevent that which the Dental Surgeon is only called upon to cure.

When children leave the parental roof to reside in schools, they should be carefully looked after. The Hygiene of the Mouth does

not yet—as it should—form a necessary part of the curriculum, and children often return to their homes, through the neglect of simple precautions, with more caries in their teeth at the end of a few school terms than can be remedied in a life time.

In order to find out with what frequency dental disease affects children who are otherwise healthy, it is necessary to step outside the ordinary routine of practice, and to examine them in large numbers. For this purpose children in schools are best; as it is easy to make observations with regularity and without risk of repetition.

Such an investigation is being carried out in various parts of the United Kingdom, by members of the British Dental Association. Children in Parochial Schools, Industrial Homes, and National Schools are being examined, and valuable statistics will be forthcoming, as the condition of each child's mouth is being permanently recorded, and every tooth is taken note of. In these pages it is sufficient to record a few facts with regard to some of these statistics, obtained after examination by the Author and Mr. Spokes. A

table showing figures has been drawn up that the reader may see at a glance the relative frequency of dental disease at various ages

The dental condition of three thousand eight hundred (3,800) boys and girls whose ages range from three years to sixteen years is recorded,

Number of Children	Age of Children	Temporary Teeth requiring		Permanent Teeth requiring		Unsound Teeth	Sound Dentitions
		Filling	Extracting	Filling	Extracting		
37	3	57				57	20
110	4	290	5			295	41
160	5	411	35	18		464	44
222	6	561	114	57		732	27
282	7	633	202	175		1010	41
201	8	366	221	163	2	752	28
340	9	468	302	365	8	1143	46
434	10	401	334	435	68	1238	79
434	11		478	439	117	1034	110
501	12		385	544	321	1250	129
477	13		236	513	337	1086	130
359	14		128	457	374	959	86
212	15		40	291	247	578	43
31	16		11	54	32	97	4
3800		3187	2491	3511	1506	10695	828

In the first column the number of children at a definite age is mentioned, thus 37 children aged 3 years, 110 children aged 4 years, 160 children aged 5 years and so on.

Temporary Teeth. There were 3,187 temporary teeth which required filling among 1,786 children whose ages varied from 3 to 10 years. Deducting from the number of children those whose dentitions were "*sound*," that is, whose teeth were free from caries, viz., 326—*vide* last column—1,460 had 3,197 saveable teeth. The number of teeth, or the remains of them, requiring extraction was 2,491, either being too carious to save, or unduly retained (to the detriment of their successors) beyond the normal period.

Permanent Teeth. It will be seen that 3,511 permanent teeth required filling, and 1,506 were so carious as to require extraction. Between the ages of 9 and 14 inclusive, 2,753 teeth, in 2,545 children (more than 1 to each child) required filling, and these, for the most part, were six-year, or first permanent molars.

Under the heading *Sound Dentitions* are enumerated those cases in which there was an absence of diseased teeth. Many of these were passing through the transitional period, between the first and second dentition. Some children required merely the easy extraction of temporary teeth to place them in a satisfac-

tory state, but it is a fact which merits careful consideration that out of 3,800 children's mouths inspected there were only 828 in which neither fillings nor extractions were required.

The facts above mentioned show very clearly that the hygiene of the mouth requires some consideration from another point of view —viz, as it affects the community. The children examined belonged to the poorer classes.

The Schools* were situated within 20 miles of London, in extensive grounds, where the inmates have all the advantage of good air and healthy exercise. They are gathered from various parishes in London. They are clothed, housed, fed and educated at the public expense.

In connection with each school is a large staff of teachers, with band and drilling masters, and they are all under expert medical supervision.

These points are only mentioned in order to show that the environment was generally good, and the children were living under healthy

* Southall, Hanwell, Sutton, and Feltham.

conditions; yet, notwithstanding all this, a vast amount of preventative disease existed among them.

The boys in such schools are either taught a trade, or enter the army and navy.

The girls are trained for domestic service.

According to the report of the Army Medical Department for 1890 (published in 1892), 55,673 recruits were examined; 21,712 were considered unfit for service. Out of these, 506 recruits were rejected on account of "loss and decay of many teeth," and although the rejections were by no means so numerous as from other diseases, yet this is an interesting statement, and not only points to the prevalence of bad teeth among the working classes, but shows clearly how lads from rate-supported schools may be disqualified from a lack of cleanliness.

458 girls from parochial schools of the metropolis *alone*, entered domestic service in one year.

Five-sixths of that number had never known the use of a toothbrush. The troubles of a domestic servant suffering from neglected teeth need little imagination to picture, but dis-

ordered digestion, irritability of temper, and inability to perform the allotted duties are some of the most obvious results which may appeal to employers.

There is an increasing recognition of the importance of systematic care of teeth. In the case of children, who during the growth of the body have not merely to maintain nutrition, it is surely a matter of urgency that all the organs of digestion should be kept in a state of functional integrity; and if. as seems to be the case, disease of the digestive tract is increasing, it is evident that any departure from the normal dentition places the child and future adult at a disadvantage.

Instead of waiting until the child suffers pain and thus directs attention to a carious tooth, it is far better, both for patient and operator, that the earliest appearance of caries should be noted, and its progress prevented, by a regulated system of inspection and prompt treatment. Under such circumstances dental disease and the necessity for painful operations become reduced to a minimum, and at the same time the function of mastication is retained.

Referring once more to the table of figures, it will be seen that 2,972 children had among them 10,695 carious teeth.

In one school of 661 boys, according to the medical officer's report, 135 were admitted to the Infirmary during one year for dyspepsia alone.

With the Medical Practitioners will rest, to a large extent, the responsibility of pointing out to all who are concerned with the care of children, the need for constant dental supervision, whether it be poor law guardians who stand *in loco parentis*, or the managers of private and public schools.

A clearer recognition is needed of the fact that a knowledge of his own body, and how to treat it well, is an essential factor in a child's education; also that a tooth-brush drill is as needful as any gymnastic exercise for the preservation of health.

In order to show what can be done in some measure to remedy and keep in check dental disease, we record with pleasure the following brief report issued by the Dental Surgeon of the Hanwell Schools who was appointed by the Guardians when the condition of the children's teeth became known to them.

SUMMARY OF DENTAL REPORTS AT THE CENTRAL LONDON DISTRICT SCHOOL.

	Inspections with Chart	Extractions		Stoppings		Scaling Cases	Regulation Cases
		Temporary Teeth	Permanent Teeth	In Temporary Teeth	In Permanent Teeth		
1892—93	1153	649	76	10	316	54	3
1893—94	1245	586	109	29	277	61	6
1894—95	1100	514	100	24	241	51	18
1895—96	1172	448	141	11	289	49	12
1896—97	1142	424	93	6	282	54	7

There is reason to believe that higher in the social scale the occurrence of Caries is still more frequent. Thus in a high-class Public School, where the boys, however, were all over thirteen years of age, out of 427 examined only seven had dentures free from decay or loss of teeth. The actual condition, however, was not so bad as these figures indicate, for a large number of carious teeth had been stopped, and the dentition rendered "artificially sound."

Having considered this important subject as it concerns children who are living under the

ordinary conditions of health, it now remains to discuss the Hygiene of the Mouth as it affects children who are suffering from disease.

That diseases of the teeth are more frequent in those who are sick than in those who are well, is a matter of common observation; and dental surgeons know by experience, how rapidly teeth have become carious after a serious illness. While considering somewhat in detail the reasons of such alterations in the dental tissues it is desirable to place on record some facts with regard to the conditions of sick children's mouths, and then to see what conclusions can be drawn from them; at the same time supporting such conclusions, as far as may be, by illustrative cases drawn from clinical experience and gathered from various sources.

A careful tabulation has been made of 500 boys and girls suffering from various diseases in the wards of the Evelina Hospital for Sick Children, Southwark. These cases were tabulated only when there was no complaint of toothache or other sign of dental trouble, and would, therefore, under ordinary circumstances, have escaped attention and treatment. A

record was made on somewhat similar lines to those already mentioned in connection with the poor-law and industrial schools.

Some Results of an Examination of 500 boys and girls in the Wards of the Evelina Hospital for Sick Children, Southwark, whose average age was 6 years 6 months.

Diseases	Number of Children	Carious Teeth		Total Number	Sound Dentition
		Temporary	Permanent		
Rickets	92	261	19	280	25
Diseases of the Nervous system	56	291	81	372	6
Diseases of the Alimentary Canal... ...	40	147	24	171	9
Diseases of the Bones and Joints	180	616	142	758	28
Diseases of the Respiratory Organs ...	104	532	40	572	21
General Tuberculosis	28	166	39	205	1
	500	2013	345	2358	90

In the first column will be found a list of those diseases which may be considered as fairly including the large majority of cases admitted to a children's hospital.

Rickets. 92 children had well-marked rickets, and among them 25 were entirely free

from caries of the teeth. The average age was four years, and there were 261 carious temporary teeth, and 19 carious permanent teeth; a total number of 280 among 92 children. In very many cases the dentition was considerably delayed. In only 7 children out of 92 were the temporary teeth defective in structure—so far as naked-eye appearances can show—thus bearing out what has been previously stated* by Dr. G. A. Carpenter and the author that in rickety children there is, as a rule, no deficiency of enamel.

Delayed dentition is the only reliable test so far as the teeth are concerned, and an examination of a child's mouth will often lead to a recognition of rickets long before the appearance of other symptoms, such as beading of the ribs, enlargement of wrists and ankle bones, &c

There is no evidence to prove that caries is more frequent among rickety children than among those who are suffering from other diseases.

Diseases of the Nervous System.—56 children

**The Lancet*, June, 1892. Primary Dentition in its relation to Rickets.

were suffering from diseases of the nervous system. 6 had healthy mouths, 50 children had 291 carious temporary teeth, and 81 carious permanent teeth, 372 in all.

While the *disorders* associated with the *eruption* of temporary teeth have been well recognised and often exaggerated from the time of Hunter to the present day, the disorders connected with *caries* of the temporary teeth have as yet been scarcely realised.

Carious teeth are a source of irritation from which the *nervous system* may be readily affected, more especially in young and growing children where its condition is unstable, and readily responds to abnormal stimulus.

As a direct source of irritation, pain in the affected tooth may occur, or pain on the same side of the face and head. Both headache* and earache†—so common among children apart from any organic disease—are frequently due to and kept up by the same cause.

In such cases attention should soon be directed to the origin of the trouble, but it is

* Lauder Brunton. *Disorders of Digestion*, pp. 48, 76.

† Campbell. *Headaches and other morbid cephalic sensations*, p. 30.

well to remember that pain is only *one* symptom of carious teeth, and all the evidence here obtained proves that it is one of small significance, for, as mentioned above, not one patient in 500 complained of toothache.

The earliest manifestations of *reflex* irritation in connection with temporary teeth are well known in retarded eruption, where the occurrence of even general convulsions is by no means rare. Later, the signs of reflex irritation from carious teeth are not always recognised, but they do exist, and it is necessary for the Practitioner to be aware of the fact. Mr. Coleman, F.R.C.S.,* states that "true cases of epilepsy do occur, the result of irritation set up by diseased temporary teeth; some of these have come under the notice of the writer, in which there could be no doubt as to cause and effect."

To Dr Morgan, of Seaford, I am indebted for the following notes of a case in his practice.

Q. Bennett, aged 9 years. A delicate-looking girl very anæmic. Four years ago she had a severe fit, after which she was unconscious for about an hour. From that time she used to have slight fits in the morning about twice a week, lasting from one to two minutes. The child was seen in June, 1894, and being very thin and emaciated, was ordered Syr. Ferri. Iodid. and Ol. Morrhuæ.

* *Manual of Dental Surgery and Pathology*, p. 331.

She had some very carious teeth on both sides of the mouth. Chloroform was administered, and 6 carious molars were removed from the upper and lower jaws on June 13th. Since then the child has greatly improved in health, and has not had one fit. There was no history of epilepsy in the family. She had no convulsions as an infant.

Mr. Tomes* and Mr Salter† place on record well authenticated cases of nervous disorders as the result of reflex irritation from carious teeth. One case from the latter writer is worth quoting, of Dr. Ramskill's patient.‡

A boy, æt. 13, has had frequent attacks of epilepsy for the last eighteen months. Latterly his mother has noticed that some days he rubs his left cheek, complaining of face-ache, after which the fit follows. On examining the mouth, there is to be seen a molar tooth considerably decayed, with a swollen gum around it, and partly growing into the cavity. It is not very tender to the touch, and the examination does not give rise to toothache. On questioning, I find the sensation which the boy experiences before a fit does not seem to be one of pain, but rather of an indefinite uneasiness. He always has a fit the night this comes on. Has never felt it during the day, it is always about seven or eight o'clock. I desired the mother to have the tooth extracted, and ordered a simple saline with a quarter of a grain of belladonna to be taken twice daily. This was in June. The tooth was extracted next day. I saw this boy once a fortnight from that time for four months, but he has had no recurrence of the fit.

Among the 56 children referred to under the heading of nervous diseases, 27 had well-marked symptoms of chorea, and only one child was free from carious teeth.

* *Dental Surgery*, pp. 564, 579.

† *Dental Surgery and Pathology*, p, 255, et seq.

‡ *Medical Times and Gazette*, 1862.

The following is a typical case from those mentioned.

A. W. A boy, aged 8 years, has 2 permanent teeth, and 8 temporary teeth, carious. Of this number 2 temporary molars in the upper jaw, 3 temporary molars in the lower jaw, and 1 temporary canine were extensively decayed and necrotic. *These required removal.* Mouth foul.

The causation of chorea is by no means assured. It is well known that the symptoms arise in children of a neurotic type. The symptoms appear to lie dormant for a time and then be set up by very trivial causes.

Given a neurotic subject, any source of irritation may be cited as a primary cause, or as a means of keeping up the peculiar movements so typical of the disease. Though often associated with rheumatism, chorea appears to be the expression of a nervous system goaded to desperation by accumulated ills. Removal of one evil alone does not effect a cure. It is only as each one is sought out, and removed, that the symptoms disappear. That a fruitful source of irritation may be found in carious teeth is well illustrated by the following cases; and those above mentioned at any rate point to the teeth as an important factor, if not in causation, in the maintenance of the disease.

The first is from the out-patient department of my colleague, Dr. Soltau Fenwick.

The second is from notes taken by Dr. Wainwright, the patient being under the care of my colleague, Dr. Willcocks.

The third is from the practice of Dr. Morgan, of Seaford.

1. September 18th, 1894. Maria Heath, 8 years, has had Chorea for 3 months. Headache, palpitation, twitchings of hands and face. Treated with Liq. Arsenicalis and Pot. Bromidum: This was only followed by sickness.

September 25th. Child's mouth examined, 8 carious temporary teeth were present, also 2 carious permanent molars. Two necrotic teeth removed.

October 2nd. Headache much worse. Much pain at night. The pulp of a lower permanent molar was exposed and acutely painful—pulpitis. The tooth was removed.

October 13th. Patient quite well, all choreic symptoms have disappeared.

January 29th, 1895. Quite well, no return of chorea.

2. Harriet Buxton, aged 8 years. Chorea of 7 weeks' standing. She did not improve at all during the first 2 weeks in the hospital. A painful stump was removed. In four days all movements ceased and did not recur.

3. A little girl, aged 9 years, suffering from well marked chorea, was brought to me by her mother for advice. The mother said that the child had had twitching of the head and face and hands for 2 months past. She was getting worse, and punishment did no good! I gave her arsenic first, but found no beneficial results follow its use. I then tried zinc sulphate for a time, but the child was no better. One day, as she complained of toothache, my assistant, Dr. Murphy, removed a largely decayed permanent molar from the lower jaw. Almost from that moment the child became free from choreic movements, and she has not had a symptom of their return since (now 3 months).

The following are from notes furnished by Mr. Senior, while House Physician at the East London Hospital for children, Shadwell. They are intended to illustrate the effects of dental treatment upon children in the wards, and are published by the courtesy of the Physicians under whose care the children were at the time.

4. October 16th, 1894. Eva Cott, age 6 years. Chorea of 6 weeks' duration. 9 carious temporary teeth removed. *Result*—a marked improvement.

5. Edith Venn, aged 10 years. Chorea at 3 years and 5 years. Present attack commenced 7 weeks ago. A severe case, unable to walk or even stand. She has improved since admission. Has 6 carious molars. Two were removed. The others treated with nitrate of silver. *Result*—has improved rapidly. She can now knit with ease and celerity. Jerks still in walking. There is some loss of power in lower limbs, still she improves daily.

6. Mary Ann King, age 7 years. Chorea for two years. Since admission has varied; but not improved. 6 hopelessly bad teeth removed. Four molars and two incisors. *Result*—October 23rd discharged quite well.

7. Arthur Johnson, age 9 years. Chorea at 7½ years. Present attack commenced 8 weeks ago. On the whole there had been no improvement since admission. 4 carious molars removed. 2 temporary, 2 permanent. *Result*—The boy improved rapidly. October 24th, discharged quite well.

Diseases of the Alimentary Canal.—An examination of 40 children suffering from diseases of the alimentary canal showed that 9 had healthy mouths. Among 31 children there

were 147 carious temporary teeth, and 24 carious permanent teeth, with a total of 171 In disorders of the digestive tract the saliva is altered in character and consistency. Typical cases are seen in catarrhal inflammation of the mouth and fauces, where there is at first a distinct diminution of secretions, followed by a profuse flow of saliva. At first thin and watery; later, thick, tenacious, and ropy. In such conditions acid fermentation proceeds rapidly. As the saliva tends to cling about the necks of the teeth, and mastication of food becomes painful, softening and disintegration of tooth-structure is a necessary consequence.

Inflammation of the mucous membrane of the mouth is most frequently seen among the children of the poor, and may be induced by improper feeding and impure air. In such children, who may be said to be constitutionally weak, it is often associated with carious teeth.

Dr. Bristowe* says "Catarrhal inflammation of the mouth more frequently and seriously affects those who suffer from bad teeth, than those whose teeth are sound, and reveals itself

* *Theory and Practice of Medicine*, p. 626, 2nd edition.

mainly by pain, tenderness and swelling of the gums, and particularly of the periosteum of the sockets of the teeth. The teeth consequently become loose and tender; and neuralgic pains, often most severe at night-time flicker about the gums; and sometimes extend to the periosteum of the jaws and along the superficial branches of the fifth pair." This statement is entirely true with regard to children ; and the out-patient department of a Children's Hospital affords numerous examples. It not only applies to the simple catarrhal affections, but to the specific affections of the mouth generally described as "ulcerative stomatitis." In addition to the fetid breath, marginal necrosis of gum tissue round the necks of teeth, and unhealthy ulcerated patches on the tongue and cheeks, one frequently finds necrotic roots of teeth or carious cavities in molars with sharp edges. These not only keep up the irritation, but intensify the ulceration and sloughing of adjoining tissue both of gum and cheek which rests against them ; furnishing a plentiful supply of putrid material while mastication is reduced to a minimum.

The ulceration of the cheek is often so ex-

tensive, the inflammatory thickening so great, and constitutional symptoms so grave as often to give rise to the suspicion of Noma. Many such cases of ulcerative stomatitis are started and kept up by carious teeth*; and it is remarkable how quickly many heal up on the removal of the cause without even the aid of such a specific remedy as Chlorate of Potash. The connection between ulcerative stomatitis and carious teeth is well illustrated by the following :—

M. D., age 7 years. A pale, fairly well nourished girl complains of faceache. Had toothache 7 days ago on the right side, which gradually became worse until the face began to swell.

On examination, the right cheek was found to be much inflamed and thickened. The glands beneath the jaw were enlarged. Breath fetid. A blood-stained discharge from the mouth, and great difficulty in swallowing. The upper and lower central incisor teeth were carious and loose. In the lower jaw, on the right side, were two carious temporary molars. In the upper jaw, on the same side, were two temporary molars in a necrotic condition, and through the alveolar plate above pus was oozing from two sinuses on the inside of right cheek; opposite to the temporary molars an unhealthy ulceration of mucous membrane extended as far as the soft palate. On the same side there was a large ulcer on the tongue.

Treatment.—The temporary molars were removed. The ulcers were dusted over with iodoform. A chlorate of potash mixture was ordered, and milk diet. The patient rapidly recovered.

Carious teeth *re-act* upon the digestive system

* Salter. *Dental Pathology and Surgery*, page 188, *et seq.*

by preventing proper mastication of food, by reflex nervous irritation, and by the accumulation of the products of putrefaction within the mouth.

Among the patients examined, three were suffering from diarrhœa, uncomplicated and without symptoms of tubercular disease.

E. G. A girl, aged 3 years 11 months, had 5 carious molars.
C. B. A boy „ 7 „ „ 2 „ „
T. M. A boy „ 10 „ 9 „ „ 2 „ temporary molars and 2 carious permanent molars.

The causes of diarrhœa seem to be innumerable: but there are two which seem to be worthy of mention in relation to the teeth.

That the peristaltic action of the intestines and the increased secretion of the intestinal glands may be profoundly influenced through the nervous system in young children, is recognised by the Physician; hence the term "Nervous Diarrhœa." The commonest example of this is to be found in delicate nervous children as the result of fright, anxiety or mental excitement. Any source of nerve irritation is liable to bring on such attacks. Painful or difficult dentition has long been considered a cause, and the writer has seen several cases where nerve irritation from

carious molars was the only traceable cause for such a condition. The diarrhœa ceased when the teeth were removed or otherwise treated.

A far more frequent source of this complaint is to be found as the result of the introduction of poisonous products to the alimentary canal. Foul emanations from sewers, decomposing food and bad water are amongst those most frequently mentioned. There are, however, conditions often existing in the mouths of children which are quite sufficient to give rise to systemic disorders of which diarrhœa is only one symptom.

Inability to masticate food favours the deposition of lime salts (tartar) upon the teeth, also the retention of particles of food which rapidly undergo decomposition. Apart from these evils an untreated carious tooth is in most cases a receptacle for food which furnishes material for bacteria. Especially is this the case when the cavity contains the portion of a pulp no longer living. It may be mentioned that the nerve cavity contains a mass of soft material consisting of connective tissue, cells, blood-vessels and nerve fibres. When caries has reached the "nerve" and the

pulp is affected and exposed, after a variable period of inflammation the pulp generally dies and putrefactive changes take place owing to the entrance of the fluids of the mouth, air, and bacteria. The pulp chamber and its contents are relatively large in young teeth, hence exposure and death are more rapid.

Such a tooth contains a small mass of putrid material which is added to by the *débris* of food. Where several teeth in this condition are found in the mouth (as in the patients above mentioned) the products of putrefaction are daily mixed up with the food and swallowed in addition to small quantities of pus which oozes out through the alveolus.

In order to prove the presence of such material it is only necessary to remove the contents of a necrotic tooth and examine it. It has the most fetid odour and is crammed with micro-organisms and their products. Dr. Miller, of Berlin, in his interesting and instructive book* gives an account of experiments performed by him as to the effect of micro-organisms on the digestive tract to which we would refer the reader. He points out "that the micro-orga-

* *The Micro-organisms of the Mouth.*

isms in an unclean mouth, quite independently of those introduced with food and drink, suffice to produce intense fermentative processes, chronic dyspepsia, etc.," in the stomach.

The following cases are from notes supplied by Dr. Wainwright, the resident House Surgeon at the Evelina Hospital, as to patients under the care of Dr. Tirard and Dr. Willcocks.

1. Mary Banton, æt. 7½. Stomatitis and diarrhœa of 5 weeks standing. Nearly all the teeth were carious and very foul. Four were removed. and a mouth-wash of Pot. Permang. was ordered, and was also used with the tooth-brush. The mouth became clean, and the diarrhœa ceased in one week.

2. Ada Halliday, æt. 10. Pertussis and constant offensive diarrhœa. 5 carious teeth were removed. The same mouth-wash was ordered. The diarrhœa ceased almost at once.

3. Charles Burnet, æt. 8. Aortic valve disease. Chronic diarrhœa. 5 teeth and roots extracted. The diarrhœa ceased in 4 days.

4. Harry Morgan, æt. 4 years 6 months. 4 teeth removed after 2 weeks. The diarrhœa ceased in 6 days.

5. Mary Ann Haines, æt. 7. Chronic diarrhœa. A feeble emaciated child. Weight 2 stone 6 lbs. Motions 3 per diem, very offensive. Three very foul stumps were removed on May 11th, and the child given full diet. On May 18th her weight was 2 stone 9 lbs., and the diarrhœa had ceased. On June 2nd the weight was 3 stone 5 pounds., and her general appearance was very good.

6. Horace Few, æt. 3½. Broncho-pneumonia and chronic diarrhœa. The child did not improve for 5 weeks. Then the

carious and purulent remains of 5 front teeth were removed. Both bronchitis and diarrhœa ceased. The weight rose from 1 stone 5½ lbs. to 1 stone 11½ lbs. and he left the hospital in 14 days quite well.

7. Elizabeth Brand, æt. 8 years. Chronic tubercular peritonitis with very offensive diarrhœa. This continued for 9 days, when 3 stumps were removed, freeing a lot of pus. Though the diarrhœa continued, its offensive character ceased at once.

8. Edith Blackwell, æt. 6. Corneal ulcers 18 months, bad *stomatitis* and diarrhœa. Was constantly sick and would eat nothing. 6 teeth and stumps were removed. The appetite returned, the diarrhœa ceased; and as nutrition improved the corneal ulcers disappeared and have not recurred.

9. Alice Webb, æt 6. Broncho-pneumonia and diarrhœa. The latter had been constant for 10 weeks. On admission 4 carious teeth were removed and a mouth-wash ordered. The diarrhœa ceased in a week, and the bronchitis cleared up rapidly.

10. Caroline Willcocks, æt. 3. Extreme *stomatitis* and diarrhœa with great emaciation. Pus was oozing from all the teeth which were carious. They were removed, The child became quite well at once, grew fat and is still so, though toothless.

11. Ellen Burns, æt. 6½. *Broncho-pneumonia and diarrhœa.* 3 lower molars were removed, one opening up an abscess cavity. The diarrhœa ceased, and in 4 weeks the child's weight increased from 2 stone 3 lbs. to 3 stone 4½ lbs.

The diarrhœa in all these cases was of the same nature. About three motions each day, which were frothy and intensely offensive. In most cases the offensive character disappeared for some days before the diarrhœa ceased.

The effects of swallowing quantities of putrid material are associated with other symptoms

besides those of disturbance of the alimentary canal.

When the toxines are taken up by the lymphatics of the stomach and intestines, they pass into the blood stream. Headache, nausea, and vomiting follow, showing a disturbance of the nervous system. These symptoms are generally accompanied with slight fever. The temperature rises from 101 deg. to 103 F., and anæmia follows. Such a form of septic poisoning is known as sapræmia,* and is "due to the absorption of a chemical substance, and is in no sense of the word an infective condition." This is proved by the rapid disappearance of all symptoms when the source of supply is stopped.

Modified forms of sapræmia from foul mouths are of frequent occurrence among both adults and children.

The following cases are illustrative of this condition. The first is from notes supplied by Mr. Senior; the second from notes furnished by Dr. Wainwright.

* *Sapræmia*, by Victor Horsley, F.R.S. Heath's *Dictionary of Practical Surgery*.

1. October 16th, 1894. Clara Pollington, age 6 years. Had measles at 2½ years. Whooping cough at 4 years. Always delicate. Highly neurotic. Anæmic. Has suffered from pains in the head on and off for 6 months, with occasional attacks of vomiting.

This child had 13 carious temporary teeth, 3 were extracted; the others treated with nitrate of silver every morning. She rapidly improved, regained appetite and flesh. October 20th, was discharged quite well.

2. Jessie Hamilton, age 11. Admitted as tubercular meningitis. Emaciation extreme, marked anæmia, constant vomiting. Breath most offensive. The child seemed almost moribund. The mouth was cleansed with Pot. Permang. for 3 days, then 7 teeth were removed. She was given full diet. In 8 weeks her weight increased from 2 stone 11 lbs. to 4 stone 8 lbs. Seven months later she weighed 5 stone 11 lbs.

Dr. Wainwright believes these symptoms were due entirely to the swallowing of pus.

Diseases of the Respiratory Organs.—One hundred and four children were examined who were suffering from various diseases of the respiratory organs, pneumonia, bronchitis, broncho-pneumonia and phthisis. Among them were found 21 healthy mouths; 532 carious temporary teeth, and 40 carious permanent teeth were present. A total of 572 carious teeth in 83 children with unhealthy mouths. Nearly 7 to each child.

The high temperature, in addition to digestive disturbance, which accompanies diseases of the respiratory organs has a marked effect

in rendering the mouth unhealthy. The tongue is furred, and the secretions of the salivary glands are scanty, and sordes accumulate on the teeth. Hence caries of the teeth is accelerated.

There were 26 patients with pneumonia, and only two of these had sound teeth. A typical case was :—

T. P., a boy aged 5 years. Croupous pneumonia. 4 upper incisors quite loose, but not carious. 3 lower temporary molars carious, and in a necrotic condition. From sinuses connected with two of these molars pus was oozing at the apex of the roots on the outer side of the alveolar plate. Mouth foul. Marginal ulceration of gums.

That it is possible to establish any connection between the condition of this patient's teeth and the disease from which he was suffering, we do not pretend. But there are interesting facts in connection with bacteria frequently found in the mouth and with Pneumonia which deserve mention.

Croupous pneumonia is now looked upon by many physicians and pathologists as being due indirectly to a specific organism. Among the pathogenic organisms found in the mouth is the micrococcus of sputum septicæmia. This when introduced into the bodies of animals in

many cases produces the symptoms of acute septicæmia. It is found in the mouths of those suffering from pneumonia, also in the mouths of healthy persons.

1. Dr. Emil Schreier, as mentioned by Kirk,* examined some twenty cases of apical inflammation in the roots of teeth, and found this organism (which is identical with that of A. Fraenkel's diplococcus pneumonia) in every one of them.

Dr. Sims Woodhead† suggests that this micrococcus may remain in the mouth for some time without giving rise to any symptoms. Finding its way into healthy lung tissue it will have no effect; but if there is slight inflammation or congestion, it "is enabled to grow on the exuded fluid constituents of the blood, and to set up at once those intense inflammatory changes characteristic of croupous pneumonia or acute inflammation of the lungs."

2. The micrococcus of septicæmia has also been found in diseases of the middle ear and in meningitis; thus suggesting the transmission of this organism from the mouth to the pharynx

* *British Journal of Dental Science*, Nov. 1, 94.

† *Bacteria and their Products.* Vide p. 344.

where it may find its way along the Eustachian tube, setting up acute inflammatory mischief which may extend to the membranes of the brain.

That there is a connection between conditions of the mouth and lungs is often seen in cases of septic pneumonia which occur after operations about the mouth. Whether such cases are due to direct transmission of organisms to the lungs or are simply a local manifestation of a general poisoning of the system, cannot with certainty be stated. It is however, evident that the presence of necrotic teeth and discharging sinuses tends to lower the vitality of a patient, and favours the accumulation of organisms which in a healthy mouth would find no encouragement to thrive.

General Tuberculosis. Twenty-eight children had 166 carious temporary teeth, 39 carious permanent teeth; a total of 205 carious teeth and one healthy mouth.

A. B., a girl, aged 8 years, with tubercular glands in the neck and in the axilla. This patient has 8 carious temporary molars, and 1 carious permanent molar.

This case is mentioned in order to direct attention to a favourite site of gland infection.

Researches made by Bacteriologists in comparatively recent times furnish abundant evidence that tubercular disease is due to the entrance and multiplication in the system of a micro-organism, the tubercle bacillus.

The sources of supply are to be found in particles of dust in the air we breathe, and in milk and the meat of tuberculous cattle. The chief channels of infection are the respiratory passages and the alimentary canal. Once a fertile soil has been found the bacillus multiplies and spreads through the tissues, there producing those changes which lead to the various manifestations of this disease. This in brief is the Bacteriologists' view.* Clinical evidence tends to show that when the lungs are attacked as in Phthisis, the meninges of the brain as in Tubercular Meningitis, or the glands of the intestine as in Tubercular Peritonitis, these are but local manifestations of systemic disease.

Where, however, the glands of the skin are attacked, tubercular material may be found *only* in those glands; and their prompt and thorough removal is looked upon by many surgeons as a means of arresting the spreading

* *Vide* Dr. Sims Woodhead's *Bacteria and their Products.*

of this disease to other glands by "continuity of tissue."

One of the commonest sites, if not the most common, for tubercle to develop in such glands is about the neck and beneath the lower jaw; in those lymphatics which drain the surfaces of the head and face, in fact those parts most liable to irritation.

Enlargement of the lymphatic glands in the neck is due to the absorption of inflammatory products through the lymph canals of the skin, or mucous membrane. Inflammatory affections of the scalp, the ear, and the mouth, are the ordinary sources of such irritation.

Mr. Owen, the Senior Surgeon to the Children's Hospital, Great Ormond Street, W., has directed attention* to the fact that *septic* infection of the glands beneath the jaw frequently takes place in children through carious teeth. This view accords with the experience of many dental surgeons and practitioners. Such septic infection generally takes place through the open pulp chamber of a tooth, where the pulp is in a putrefactive condition.

* *Odontological Society's Transactions*, June, 1894.

It may be simple and transitory, disappearing when the site of infection has been removed, but it may be tubercular, and, spreading to other glands, infect the whole body.

Diseases of Bones and Joints.—Out of 180 children examined there were found only 28 healthy mouths. 152 children had 616 carious temporary teeth, and 142 carious permanent teeth, a total of 758 carious teeth.

The following is a typical case:

J. S., a boy, aged 7 years 9 months, with hip-joint disease. This patient has 4 permanent molars carious, and 8 temporary molars carious.

The total number of children examined was 500. There were 90 healthy mouths, and the total number of carious teeth was 2,358.

The facts are interesting as showing what an amount of disease may exist in the mouths of children without causing any obvious suffering. They also prove what one has been led to expect, that carious teeth are more prevalent among sick children than among those who are healthy.

It is also interesting to note that what is often described as a disease of one organ of the body is but a local manifestation of

general weakness of tissue, either inherited or acquired. For instance, a child with hip joint disease may be syphilitic ; another who is the subject of empyema may be rickety; another with pneumonia may be tubercular, and so on. This is recognised by surgeons and physicians alike, and apart from any special treatment adopted for sick children—whether it be an operation for the removal of diseased bone, the evacuation of pus from an abscess, the administration of some special drug to lessen the irritation of a cough or ameliorate the sufferings of a patient—there is a general course of treatment adopted in all cases which has for its main object the careful nutrition of the whole body. Briefly, this general treatment consists of the removal of all sources of irritation, to procure rest, perfect cleanliness, nutritious food, and pure air. On such hygienic conditions do the surgeon and physician rely for the cure of disease, rather than upon any other method of treatment. Whether we believe with Metschnikoff that the leucocytes of the blood and tissues devour pathogenic bacteria when the body is in health, and that this resisting power is lost when nutrition

is impaired, the evidence—accumulating almost daily—of the origin and causation of diseases seems to point to a time when empirical measures will surely pass away, and the administration of special drugs for the curation of the numerous "ills the flesh is heir to" will be replaced by the more sure and certain improvement of the general conditions under which we live.

That carious teeth are a source of irritation, no one will dispute; and the fact that in 410 sick children, out of 500 examined, an average of nearly 5 such teeth were present in every mouth,would seem to show that of all sources of irritation this is the most important because of its vast preponderance over all others.

That more work shall not be thrown upon the stomach than it is able or fitted to perform, it is necessary that a child shall be able to masticate its food. How much *more needful* then (nutritious as that food may be) in cases where the stomach is already enfeebled by disease.

That mouths are rendered foul by the presence of carious teeth in health, gives additional point to the urgent necessity of

adopting measures of cleanliness in sickness; for however wholesome is the diet, and pure the air before entering the body, once having passed the portals of a chamber crammed with bacteria and their products, they are wholesome and pure no longer. Further, it may be pointed out that while food passes on to the alimentary canal leaving only remnants to form a veritable feast for the micro-organisms of the mouth, the air is returned and may prove a source of danger to others. That this statement is not entirely fanciful is abundantly proved by the evidence we have in cases of such diseases as whooping cough, measles, scarlatina and diphtheria, where the infection is carried by the breath; and isolated cases of infectious diseases which occasionally arise in the medical and surgical wards of a Children's Hospital are of sufficient importance to direct attention to the mouths of patients as a source whence the air may be vitiated.

It seems reasonable, therefore, to conclude that while the conditions of the oral cavity in sick children are left untouched or are ignored, no small part of that general hygiene so necessary for restoration to health remains unfulfilled.

Summarising what has already been stated with regard to the examination of the sick children, we may say there is no distinct proof of a connection between dental and other diseases as cause and effect; but there is strong reason to suspect, and even to believe that many of the diseases of the nervous system, diseases of the respiratory organs, diseases of the alimentary canal may be due, in some cases directly, in others indirectly, to the fact that the masticatory organs have been neglected.

Carious teeth besides causing nervous irritation may prove the starting point of putrefaction and its allied processes, and, acting as an infective focus, materially influence diseases of the respiratory organs and of the alimentary canal. Or, apart from loss of function, they may produce general *malaise*, followed by malnutrition, thus paving the way for diseases which often seem to lie in wait until a favourable opportunity is afforded of exercising a malign influence on their youthful victims.

It is only necessary here to point out general remedial measures to be adopted in sickness, as we have already indicated preventive measures in health.

A careful examination should be made of the mouth in every case of illness. This should be a matter of routine, and where clinical reports are made, as in Hospital practice, a note should be entered as to the condition of the teeth and gums with the same regularity as the condition of the tongue is mentioned. It is often found that a clean tongue is present where there is a mouthful of carious teeth, so often, in fact, as to lead one to suppose that the condition of the digestive organs may be far more surely indicated by an examination of the latter than of the former.

A cursory glance at the teeth in front of the mouth alone should not be relied upon.

In the records of the children above mentioned by far the larger proportion of defective teeth were found in the molar region. However good the incisor teeth may be, it is in this region that search should be made. The mouth should be perfectly cleansed morning and evening with some antiseptic solution. Where a child is too ill, and therefore feeble, this cleansing must be carried out by the nurse. In such cases, a mackintosh sheet may be placed round the child's neck, the head turned to one

side, so that no fluid may be swallowed. Small pieces of lint rolled up are very useful; one of these should be securely fastened in the claws of a clean sponge holder and dipped into the solution. The nurse having previously washed her hands, should with the forefinger and the thumb of the left hand, gently part the lips and with the right introduce the pledget of lint and wipe over the surfaces of the teeth, thus removing all vitiated secretions or *débris* of food.

Another method which may be adopted in such cases is the use of a clean glass or india-rubber syringe with a fine nozzle. Having filled this with a solution, the mouth can be thoroughly washed out. The syringing is especially needed where the mucous membrane of the lips and mouth is ulcerated. Where the mouth is easily opened a stream may be directed against the back of the pharynx. If the mouth be closed the stream may be directed against the necks of the teeth in front and at each side.

Whenever a child is sufficiently well it should be taught to brush the teeth after every meal.

For all ordinary purposes a quarter per cent. solution, or one grain to the ounce of permanganate of potash will answer, and the water should be warm.

Chloride of sodium (ordinary table salt) 4 to 8 grains to the ounce of water is an excellent mouth-wash.

Boracic Acid, Chlorinated lime water, Aqua menth. pip. and Chlorate of Potash are useful

In conclusion it may be pointed out, that all who are in attendance on sick children, should be scrupulously careful as to the condition of their own mouths, both for themselves and their patients.

The atmosphere of a sick room or a Hospital is not conducive to sound teeth. The writer has elsewhere* pointed out the possibility of direct infection being conveyed from the mouth; and an examination of a very large number of nurses forces the conviction that the hygiene of the mouth requires more consideration in nursing institutions than it at present receives.

* *Puerperal Fever, Lancet*, December 21st, 1889.

CHAPTER II.

ORAL HYGIENE IN ADULTS.

All the available evidence as to the abnormal and carious condition of teeth in children points clearly to the fact that a vast number of those who reach maturity have defective dentures. This alone is sufficient to emphasize the necessity for adopting all reasonable measures to prevent the further destruction of teeth in adults.

Personal cleanliness in childhood is an absolute necessity in order to keep the mouth in a healthy condition, and it may be said that increased vigilance in this respect should be shown by those of mature years.

The teeth should be carefully brushed after

every meal, and when this is not possible the mouth should be thoroughly rinsed with water. A tooth brush with stiff bristles should be used, and a good tooth powder. Preferably, immediately before retiring to rest.

The following formulæ may be found useful:

1	Precipitated chalk	4 ounces.
	Curd soap, in powder... ...	½ ,,
	Carbolic acid	20 minims.
	Otto of Roses	5 ,,
2.	Precipitated chalk	2 ounces.
	Boric acid	2 drachms.
	Orris root, in powder ...	2 ,,
	Curd soap	2 ,,
	Oil of peppermint, or Oil of Geranium	2 minims.
3.	Powdered Castile soap ...	2 drachms.
	,, Orris root	½ ounce.
	,, Boracic acid ...	2 drachms.
	Precipitated chalk	2 ounces.
	Carbolic acid	30 minims.
	Oil of Eucalyptus	½ drachm.

Of proprietary tooth powders, pastes, etc., it may be said that some are good, others bad, and many indifferent. Much harm may be done to the teeth by using such preparations without some knowledge of their composition.

Those so often advertised and "warranted" to "whiten the enamel" may very effectually do so and help to destroy it.

The receipt of a tooth powder called "Parmena" has been placed before the writer, and he has no hesitation in recommending it as an excellent dentifrice. It is antiseptic, very agreeable to use, and can be obtained from all chemists.

In addition to a quill tooth-pick, which should always be used, small strips of sarsenet ribbon $\frac{1}{4}$ inch wide and 5 inches long are extremely useful for passing between the teeth to remove particles of food, even after a tooth brush has been thoroughly employed.

With a quill tooth-pick, and before a good mirror, it is often possible to find out cavities in the teeth, especially in the front of the mouth and on the masticating surfaces of the molars, or to notice brown spots which may lead to the suspicion of caries. *Whenever there is evidence of decay advice should at once be sought.*

As previously stated, caries commences on the outside of a tooth and gradual disintegration of its substance takes place, by the

action of acid—forming bacteria, towards the pulp or nerve chamber. It is urgently necessary that such carious tissue should be removed and that any cavity which exists should be filled up by a suitable "stopping" before the nerve tissue and blood vessels are irritated or exposed *in the centre of the tooth.*

In some mouths the teeth are so sensitive that the patient is forewarned by pain flickering about the jaws, or localised in the carious tooth itself, especially when salt, sugar or liquids—very warm or very cold—are taken. If meat fibre or other food wedges between the teeth and is not easily removed it may generally be taken as an indication of decay. In many cases, however, no warning of caries is given until a portion of the tooth is broken off or some hard substance is driven through the undermined surface into the centre by the force of mastication. Hence the necessity for periodical inspection.

The objects sought to be attained in filling teeth are briefly as follows:—

To remove the edges of carious enamel and the affected dentine beneath. To replace the lost tissue with a "stopping" which shall

exclude moisture, prevent further decay, stand the stress of mastication and cause no after-pain by irritating the pulp.

Fig. 2.

Section of a molar and bicuspid tooth showing unsuspected caries hidden between the two teeth, which has penetrated the enamel and dentine and almost reaches the pulp cavity.

The stoppings or fillings used are numerous. They may be roughly divided into two kinds —*metals* and *non-metalics*.

METALS. *Gold* and *tin* are used in the form of leaf folded into small sheets, and cut into strips or rolled and cut into small cylinders.

Amalgams are mixtures of metals in definite proportion (generally melted in a crucible and cut or filed down to a sufficiently free state of division) with mercury. They are used while soft, and set hard in an hour's time or less.

NON-METALS. *Gutta-percha* with china clay and silex incorporated. *Cements* consisting of zinc oxide in powder and phosphoric acid in solution.

The respective merits of various fillings cannot here be discussed. It may be stated in general terms that the metals are the most permanent, and may be exclusively used where the caries has not approached too near the pulp chamber, and where there is no risk of change of temperature irritating the nerves of the pulp. The non-metals are used in delicate or sensitive teeth as temporary or permanent fillings, or for lining the cavities where it is desirable to have a layer of non-conducting material between a metal filling and the pulp chamber.

There is a popular impression—fostered,

doubtless, by attractive advertisements—that gold is the best filling in all cases. *In suitable cases gold is the best*, but a moment's reflection will convince the reader that teeth differ one from another even in the same mouth, and the dentist who would use only one stopping may be compared to the medical practitioner who only administers one drug whatever may be the suffering he seeks to alleviate or the disease he desires to cure.

The earlier a tooth is treated, when once attacked by caries, the better for the patient and the operator, for the patient will suffer far less and the operator will have less difficulty in preserving the tooth for future use.

When once the pulp chamber is reached and its contents are exposed to the bacteria and fluids of the mouth, the best time for filling that tooth *and the best opportunity of rendering it serviceable again have passed away.* A carious tooth may to some extent be likened to a fracture in a limb; when the deeper tissues are exposed the simple fracture becomes compound; and not only is the treatment far more complicated, but the chances of saving it are much lessened.

The exposure of a nerve is generally followed by acute pain, in paroxysms, often agonising, increasing at night-time and lasting from a few hours to days and sometimes weeks. In most cases the pain is at once referred to the tooth, but not always, as the following case will show :

Miss—, aged 29. Of fair complexion and careworn appearance. For five weeks has been in pain, more or less constant, on the left side of her head and face. The pain is much worse at night, so much so that only by the aid of drugs has she been able to obtain sleep. Under medical supervision she has been treated for neuralgia.

The patient states that she "has had no toothache whatever," and "did not think there was anything the matter with her teeth." On examination the upper and lower wisdom teeth on the left side were found deeply carious. Fig. 3. In each case caries has extended to the pulp chamber.

A minute quantity ($\frac{1}{10}$ to $\frac{1}{20}$ gr.) of Arsenious acid was placed in contact with each exposed pulp, and the cavities sealed up with a temporary stopping. This caused much pain for a few hours during the night. Two days later, the pulps of both teeth—quite dead—were removed, the roots of the teeth were filled with an antiseptic filling and the crowns with a metal stopping. From that time all pain ceased from the left side of the head and face; and the patient slept without disturbance.

It will be seen from the Fig. 3, that the cavities of decay are in front of the teeth, therefore in the act of mastication direct pres-

sure would not be exerted on the carious surfaces. This fact will explain to some extent the patient's inability to localize the pain. It is well known however, that sensory impressions, the result of injury or constant irritation are diffused over a wide area, especially in the case of the branches of the fifth nerve (vide p. 21 et seq)

Fig. 3.

Side view of the upper and lower jaws showing section through carious wisdom teeth with the nerve pulps exposed.

When we remember that a constant circulation of the blood is taking place in the pulp chamber through the vessels which—with the nerves—enter the apex of the root or roots of a tooth—the explanation of such nerve pain is

easily accounted for. The irritation caused by the exposure to bacteria or fluids of the mouth induces an increased supply of blood to be forced into the tooth, consequently the nerve tissue is subjected to great pressure. The

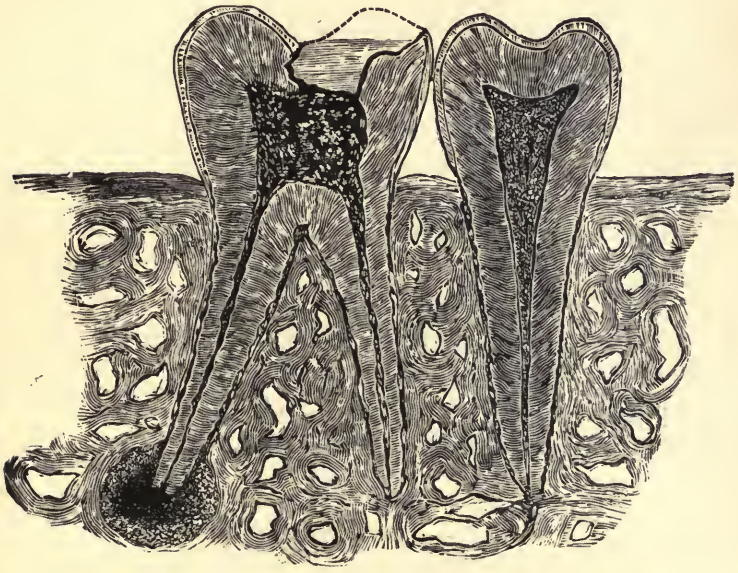


Fig. 4.

Section through a carious lower molar and a sound bicuspid tooth showing molar pulp chamber blocked with débris and an abscess forming on the posterior root. The dotted outline shows the original conformation of the tooth crown.

nerve tissue and blood vessels are confined within the bony walls of the pulp-chamber, and

there is no possibility of expansion. The result sooner or later is the strangulation of blood-vessels and nerves, in other words the pulp dies, and all pain ceases. The patient at this stage may be lulled into the suspicion that the trouble is ended.

Death of the pulp as already stated (vide p. 33), is followed by decomposition and putrefaction, and the once living tissue is converted into septic material, which when forced through the apex of the fangs into the tissues beyond—either by pressure from above, or owing to the cavity in the crown of the tooth becoming blocked, sets up violent inflammatory action. This causes intense throbbing pain, at first confined to one spot, then spreading to the same side of the jaw and face, accompanied by a high temperature. The tooth is slightly raised from the socket and exquisitely sensitive to pressure. The tissues expand and an abscess forms. (Fig. 4) Pus *will* find an exit Generally it works its way through the alveolar wall into the mouth, but sometimes through the cheek, especially where poultices are applied, or patients are foolish enough to wait

until the swelling goes down before seeking advice (Fig. 5).

The pain of an acutely inflamed pulp may be at once relieved by the application of creosote, chloroform, or carbolized resin* on a wisp of cotton wool put into the cavity of decay.

Fig. 5.—DRAWN FROM A PHOTOGRAPH.

Showing papilla on the face from which pus was oozing. Caused by a neglected six-year molar. The swelling had been incised several times from the outside.
From "*Diseases of Children's Teeth.*"

* Gum Resin ... 1 ounce.
Carbolic Acid ... 1 ounce.
Chloroform ... ½ ounce.
Filter through cotton wool.

It is necessary that the vitality of the pulp should be destroyed *within a few days.* The pulp must then be removed and replaced by a filling. If left to die slowly, putrefaction and its consequences will follow. This will explain the treatment adopted—one of many—of applying arsenious acid in the above mentioned case. It is a method requiring extreme care owing to the poisonous nature of the drug, and the fact that it destroys any soft tissues with which it comes into contact. With the escape of pus from an alveolar abscess, generally through the alveolus and gum—that is the formation of a gumboil—all pain, swelling and inflammation ceases, and the tooth settles down into its socket once more. Such a tooth if left untreated, will gradually break away until nothing but the root is left. Before this occurs other troubles may arise as shown by the following case. (Fig. 6.)

Miss L. M—, a nurse, age 25, states that she has no pain, but cannot eat with comfort. On examination it was found that this patient had an excellent set of teeth with the exception of one upper bicuspid on the right side (Fig. 6 A.)

The pulp was necrosed. All the teeth on the same

side of the mouth were coated with tartar (a deposit of lime salts from the saliva) and food, and the patient's breath was very offensive.

As immediate treatment was a necessity, the necrosed tooth was removed, also the tartar from the other teeth. In a week's time the patient's mouth was healthy. She could eat with comfort and her breath was sweet.

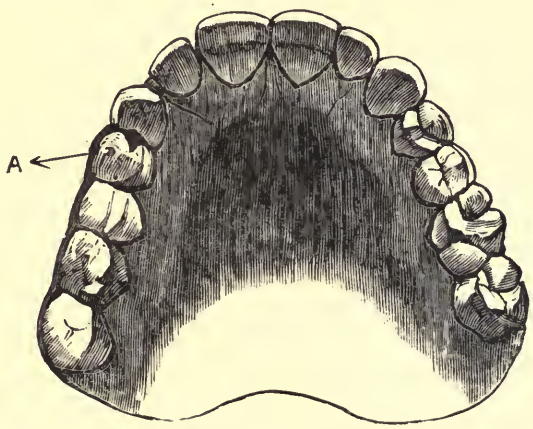


Fig. 6.—MODEL OF UPPER JAW.

Showing defective tooth at A., with accumulation of tartar on the outside of and on the teeth behind A.

Deposits of lime salts (tartar) are apt to accumulate in the healthiest mouths behind the lower incisors. When found *on either side of the mouth tartar is an evidence of imperfect mastication*, and if retained will irritate the gums and ultimately lead to the loss of some teeth.

This deposit has the *débris* of food mixed with it and will in most cases render the patient's breath offensive.

A tooth which cannot be used with comfort is avoided, and the food in mastication is transferred by the tongue to the opposite side, thus the friction so necessary for the natural cleansing of the teeth is at a standstill; not only for the defective tooth, but also for its neighbours on the same side of the mouth. The *débris* of food collects, and lime salts are deposited from the saliva which flows freely from the parotid gland.

If a little extra care were shown at such times by additional brushing and washing after each meal, material for an offensive breath and the destruction of other teeth, need not be allowed to accumulate. On the contrary—and this might be regarded as a curious fact were it not so common—no sooner do teeth become tender to bite upon, than their owner ceases to cleanse them. The sick ones requiring more care are neglected altogether. It is needful to emphasize this point, because so much rests with the individual (where it is either inconvenient or impossible to obtain skilled

assistance), and because there are certain conditions where the mouth is entirely uncared for. After or during an attack of influenza, gout, rheumatism, or during such a constitutional or disturbance as pregnancy, the teeth are apt to become tender, owing to congestion of the bloodvessels of the gums and the lining membrane of the sockets in which the teeth are implanted. During fevers, such as typhoid, the mouth secretions become vitiated, and the elevation of temperature favours the development of teeth-destroying bacteria. In any or all of these conditions, a badger's hair tooth brush with soap and warm water should be used as well as antiseptic mouth washes.

The following formulæ can be recommended,

1. Carbolic acid ... ... 1 ounce
   Glycerine ... ... 1½ ounce
   Chloroform ... ... ½ ounce

Five to ten drops in a wineglassful of warm water.

2. Dr. Miller's Antiseptic Mouth Wash.

   Thymol ... ... 3 grains
   Benzoic acid ... ... 15 grains
   Tincture of Eucalyptus ... ½ ounce
   Alcohol ... ... 3 ounces
   Oil of peppermint 25 drops

A teaspoonful to a tumbler of warm water.

3. Salicylic Acid Mouth Wash.

Acid Salicylic	...	100 grains
Ess. Menth Pip.	...	1½ drachms
Tinct. Lavand Co	...	4 drachms
Sp. Vini Rect.	...	6½ ounces
Aquæ ad	...	10 ounces

A teaspoonful to a tumbler of warm water.

Acid medicines are often blamed for causing the destruction of the teeth. If taken in considerable quantities they are apt to injure the enamel, and it is advisable after taking such medicines to rinse the mouth with warm water in which may be dissolved a little Bicarbonate of Soda. The conditions of health or ill-health for which such drugs are given are however a far more potent cause of dental caries.

The loss of one or more teeth is regarded by many with such indifference, except it be in the front of the mouth, where æsthetic considerations demand a prompt remedy, that it may be useful to inquire what are the consequences of such a loss to other teeth.

It will be seen (Fig. 7) that when the teeth are closed, each molar and bicuspid articulates with two teeth. The front teeth of the upper jaw overlap the front teeth of the lower jaw.

When a tooth is removed from the side of

the jaw *two* teeth lose a portion of their masticating surface and there is a space in which food can collect. If two teeth are lost from the same side and from the same jaw, three teeth lose a portion of their masticating surface (or

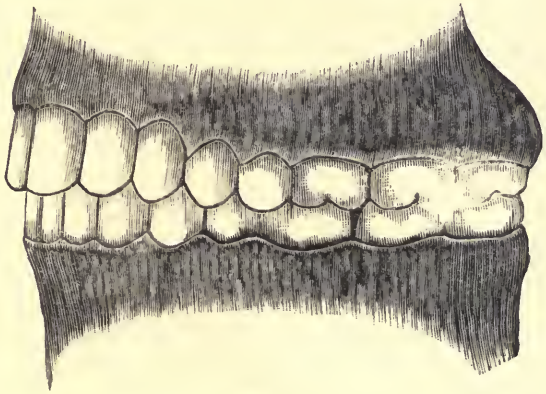


Fig. 7.

Side view of the teeth with the jaws closed, showing complete articulation.

opposing force) and the central tooth of the three will gradually accommodate itself to the altered condition by moving into the vacant space. If this occur in youth the bony socket will be built up around the tooth as it moves; when maturity is reached the tooth moves out of its socket of bone (vide Figs. 8, 9).

Fig. 8.

Side view of upper and lower jaws closed. At A. the upper molar has come down. At B. the lower bicuspid is rising up owing to the loss of opposing teeth.

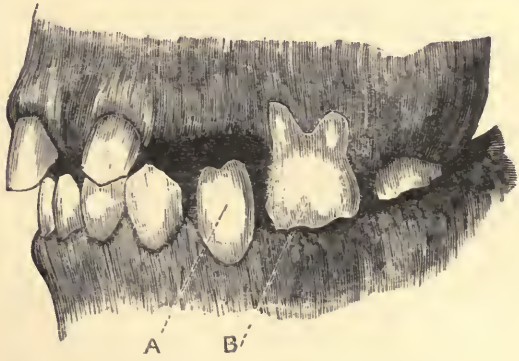


Fig. 9.

A similar case viewed from the opposite side. At B. the external roots of the upper molar are exposed. The crown of the tooth touches the lower gum. At A. the bicuspid tooth is approaching the upper gum.

So that loss of teeth means not only loss of masticating power but loss of the teeth which should oppose them. This may be gradual, but it is *sure.*

Further, as the jaws accommodate themselves to the loss of teeth they are gradually altered. In many cases the loss of molars and bicuspids throw so much work upon the teeth in front of the mouth that the upper teeth are gradually forced out of their position by the lower incisors.

Fig. 10.—Showing this condition.

By their protrusion the facial expression is altered and ultimately the teeth are lost.

The effects of carious teeth upon the general health requires some consideration, as the following cases will show.

M. B. A girl aged 17 years, of medium height, fair hair, and pallid complexion, health fairly good. She has had very little trouble with her teeth. She is training for a school teacher.

Fig. 11.

Upper jaw of a girl aged 17. All the teeth are carious.

Fig. 12.
Lower jaw of the same patient.

The illustrations are intended to show the teeth in varying stages of decay, and it will be seen that out of twenty-seven teeth only the six lower front teeth were free from caries. This patient's mouth had been entirely neglected, and many of the teeth were hopelessly destroyed. It is one of the few cases which the writer has noticed where the general health had not been materially affected. It cannot be supposed, however, that in the struggle for a living with the pressure of brain work and worry she could long have escaped some marked deterioration. It was found possible to save eleven teeth; nine were removed. Had this girl received attention between the ages of 6 and 16 scarcely a tooth need have been lost. The destruction of the teeth has been accompanied with very little pain.

After an interval of six months the patient states that she has much more strength and energy, and enjoys her food.

25 April, 1897

Miss H., aged 22, a teacher of music, of dark complexion and slight build. Weight 6 stone 6 lbs. States that she has had trouble with her teeth ever since she could remember; complains of pain in the chest and

shoulders after eating a mouthful of food. The pain is so acute that she does not care to take a meal. Suffers from constant headache (which wakens her in the morning) nausea and depression. She is constantly in the open air, walking from house to house, therefore has plenty of exercise. There were 15 teeth in each jaw, 14 hopelessly carious in the upper jaw, and 7 in the lower jaw. 9 teeth were free from caries, and these with one exception were lower front teeth. Figs. 13 and 14.

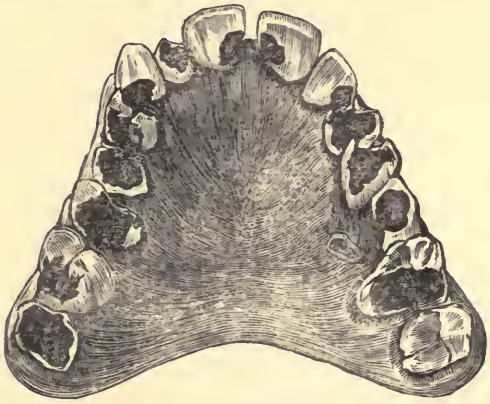


Fig. 13.

Upper jaw of a woman aged 22. All the teeth (except one molar) are carious.

Fig. 15 is intended to give some idea of the condition of many of the teeth, with small abscess sacs. From these a constant discharge of pus was found oozing through small sinuses opening on to the gums on each side both in the upper and the lower jaws. In each tooth where such conditions were found, caries had reached the pulp chamber, inflammation had followed with strangulation of the blood vessels and nerves. The putrid pulp was forced

Fig. 14.

Lower jaw of the same patient. The front teeth only are free from caries.

Fig. 15.

Side view of Figs. 13 and 14. The external alveolar plate is supposed to be removed in the bicuspid and molar region.

in small quantities through the apices of the roots. This again was followed by an abscess, swelling of the alveolus and escape of pus through the bony wall and through the gum. These facts will explain the patient's remark that she had trouble with her teeth ever since she could remember.

Nitrous oxide and ether were administered and at each sitting 3 or 4 teeth were removed.

July 26.

The patient is much better, has neither pain after eating, nor headache. Weight 6 stone 11 lbs.

August 12.

Artificial teeth were supplied to replace those extracted.

November 4.

The patient enjoys her food; is now quite well. Weight 7 stone 2½ lbs.

The results obtained by the treatment adopted appear to be very satisfactory. It may be well however, to anticipate some criticism as to the method of treatment by inquiring, "Is it not possible to save these so-called 'hopelessly' carious teeth, restore them to a condition of health, and thus save the patient from such 'ruthless extraction'"?

The removal of all putrid material from the pulp chamber and the roots of a tooth by the aid of special instruments and powerful antiseptics, filling the roots permanently and

restoring the crown either with a suitable stopping or an artificial crown attached to the neck of the tooth, is a matter of daily routine with the Dental Practitioner. Vide Figs. 16, 17, 18, 19.

Fig. 16.

Showing crown attached to the root of an upper molar tooth.

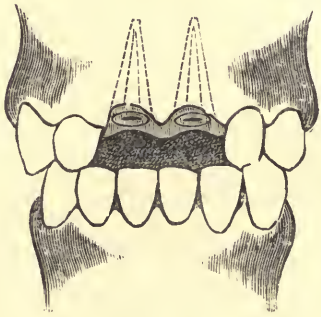


Fig. 17.

Showing roots of upper central teeth prepared for porcelain crowns.

Fig. 18.

Side and front view of porcelain crowns with platinum pins.

Fig. 19.—Teeth in position.

Teeth so treated often serve their purpose for years. It is necessary however, to use a wise discretion, for at this stage the patient's health is the first consideration. There are many teeth, especially upper molars, with roots which it is almost impossible to render free from septic material, owing to their small size and devious curves. Such roots when crowned may be compared to "whited sepulchres,"

beautiful without, but retaining the worst elements of death within. To fill or crown teeth while still in a septic condition, leads to endless trouble and annoyance, until they are removed from the jaw. In order to avoid the necessity for extraction the remains of the crowns of teeth are often cut down level with the gum, and covered with artificial teeth, on a plate made of gold or vulcanite. This method may be adopted in suitable cases on *one condition only*, viz., that all septic material be removed from *each* root and each root be filled.

Dread of pain and fear of the loss of teeth often lead patients into the hands of the unscrupulous who advertise their ability to do all things appertaining to dental matters painlessly and without extractions. In order to save time and trouble teeth are cut down and either crowned or covered with artificial teeth, and pulps are left to die and become putrid. That such a course of action may lead to ill-health is shown by the following case.

December, 1896.

M. L. G., aged 29, unmarried, of pallid complexion. Weight 9 stone. This patient has been ailing since April.

Complains of pains in her chest, between the shoulders and down the spine. Constant nausea and retching, (bringing up sour water). Always has a nasty taste in her mouth in the morning. Never enjoys a meal; and has much difficulty in eating. Often has swellings above the lip. On examining the mouth the patient was found wearing an artificial plate carrying several teeth. Fig. 20. Beneath the plate were found six roots of teeth,

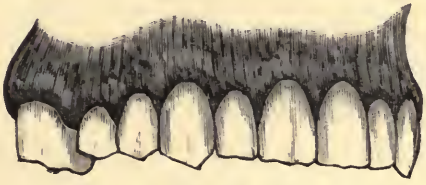


Fig. 20.

Upper jaw, showing artificial teeth in position.

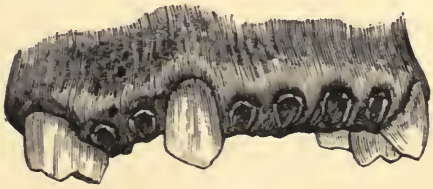


Fig. 21.

The same when artificial teeth have been removed, exposing carious roots.

which had been cut down level with the gum. Fig. 21. In each root were the remains of a putrid pulp, and above the roots of the four incisors were sinuses from which pus was oozing. The gums were much inflamed and the patient's breath was fœtid. The remains of the six teeth were extracted, an anæsthetic being administered.

1 February, 1897.

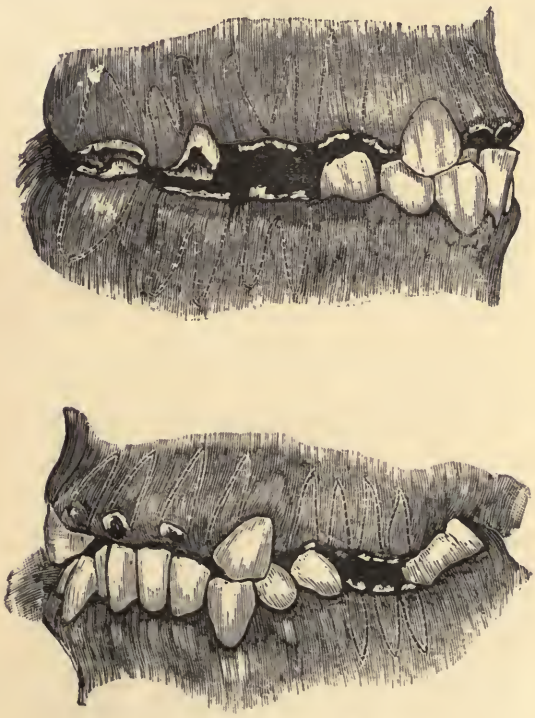
Six weeks later artificial teeth were placed over healthy. gums. The mouth is quite clean. The appetite is good. All pain has ceased. The complexion is healthy looking. The weight is 10 stone 2 lbs.

There can be very little doubt that this patient was suffering from a modified form of Sapræmia, a form of poisoning already referred to in the case of children, which is due to the absorption into the blood of chemical poisons generated where putrefaction occurs, in addition to the disturbance and pain from inability to masticate food properly.

There are cases where roots of teeth may remain healthy for many years without treatment. We have seen mouths containing nothing but the remains of teeth, carious and broken down almost to the gum line, forming masticating surfaces, where the patient's health seemed to suffer no deterioration.

It is desirable to emphasize the fact that the remains of teeth when simply covered (by a plate or artificial teeth) have neither the advantages of friction of food, nor the direct pressure of mastication; and though at first there may be no discomfort, they are sure to be a source

of irritation later. Furthermore, this gradual protrusion from the gums interferes with the stability of the denture.



Figs. 22 and 23.

Upper and lower jaws closed, viewed from opposite sides, showing the remains of carious teeth. The dotted lines are intended to indicate the position of their roots.

August 24, 1396.

Mrs, M. P., age 31, states that she has suffered from indigestion for ' years. Pain in chest and back. Constantly feeling sick, suffers from constipation. Headache two or three times in each week for many hours at a time, especially on the crown of the head. Always a nasty taste in her mouth in the morning. On examination all the teeth in the upper jaw were carious, necrotic, and broken down

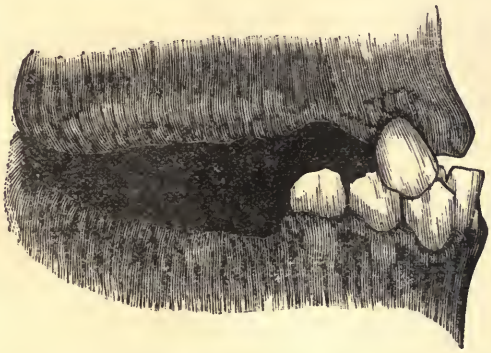


Fig. 24.

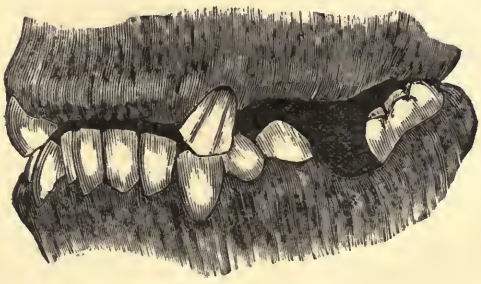
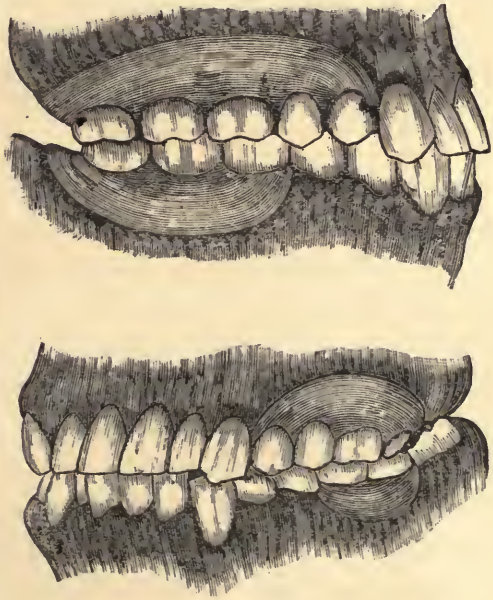


Fig. 25.

level with the gum with the exception of the two canines which were quite healthy. In the lower jaw the six molar teeth were carious and necrotic. The lower front teeth were covered on the lingual surfaces with tartar. Figs. 22 and 23.

The gums were much inflamed round the necks of the teeth.

The patient's breath was very offensive. All unhealthy teeth and roots were removed by the 1st week in October.



Figs. 26 and 27.

Showing Figs. 24 and 25 with artificial teeth placed on healthy gums.

January 12, 1897.

Figs. 24 and 25 illustrate the condition of the patient's mouth, at the time in a healthy condition. The patient stated that her headache was gone. The pain in her chest and discomfort after eating had ceased. Her mouth was quite clean in the morning. No constipation. She was healthier altogether and enjoyed her food.

Artificial teeth were then inserted. (Figs. 26 and 27.)

Instructions were given as in all such cases, that the teeth should *be removed night and morning* and *thoroughly cleansed with soap and water.* If this is neglected, the débris of food accumulates, decomposes and renders the patient's breath offensive, sound teeth may become carious, and the health of the patient will suffer.

It is sometimes forgotten that indigestion commences in the oral cavity as surely as digestion. The offensive breath so often associated with carious teeth is a very significant symptom, and should lead to the suspicion that loss of appetite and nausea may have their origin in an unhealthy and an unclean mouth, in a palate vitiated, disgusted with its surroundings, and resentful in its own particular way, for " The Palate is placed like a dietetic conscience at the entrance gate of food, and its appointed function is to pass summary judgment on the wholesomeness or unwholesomeness of the articles presented to it. It acts

under the influence of a natural instinct, which is rarely at fault. This instinct represents an immense accumulation of experience, partly acquired and partly inherited."* Or may it not, with equal truth, be said that "a dietetic conscience," whose environment is corrupt, becomes tainted by long association with evil, and is no longer capable of sound judgment. The experience of the past is no longer a guide.

It might be supposed that where a mouth is so unhealthy owing to defective teeth the signs of disordered digestion would be very obvious; but this does not necessarily follow. In proof, we give an abstract of a case reported by Sir R. Douglas Powell in his Lumelian Lectures on "Diseases and Disorders of the Heart." †

A married woman æt. 36, had for two years suffered from excessive cardiac irregularity, and frequent attacks of spasmodic heart panic. She attributed her illness to much mental anxiety. Her symptoms had increased and the cardiac disturbance became so constant that she could neither go into society nor receive friends. There was no valvular disease of the heart, its dimensions were normal, but the action was irregular and intermittent. Her teeth

* "Digestion and Diet." P. 166, et. seq., Sir William Roberts.

† *The Lancet.* 26th March, 1898.

were extensively decayed, surrounded with tartar and the gums were unhealthy. The affected teeth were removed under gas and ether "which she took well," and from that time all the heart symptoms entirely ceased.

"In this case there were *no marked dyspeptic signs*, and the cardiac symptoms seemed to be due chiefly to the reflected irritation of decayed teeth."

Brief as this abstract is, it would scarcely be possible to find better evidence of the necessity for removing teeth under certain circumstances. The idea that "teeth need not be extracted" can only exist in the minds of those, who regard them apart from the individual to whom they belong; and who ignore the fact that restoration of health must be the object of all treatment, whatever the temporary sacrifice may be.

September 2, 1896.

Mrs. C. H., aged 30, has been losing her teeth for years. She has a "gathering" now and then. Does not suffer from toothache now, nor has she for years. Complexion pallid. Complains of constant headache, especially after meals. Never has an appetite. Suffers from much nausea, vomiting, and diarrhœa.

Weight 8 stone. Temp. 101.2

On examination it was found that all the teeth (with the exception of one molar) were hopelessly carious in the upper jaw. Only the incisors and canine teeth in

Fig, 28.
Upper jaw showing the remains of carious teeth.

Fig. 29.
Side view of Fig. 28., with the lower jaw in position, and dotted outline of the roots.

the lower jaw were healthy; the molars and bicuspids were carious to the gum line.

There were several sinuses at the apices of the roots; small quantities of pus were oozing from these through alveolus and gum beneath the lips. Figs. 28 and 29.

The gums were inflamed and irritable round the necks of the teeth or the remains of them. It was decided to remove every carious root. This was done under Ether and Gas; 4 or 5 teeth were extracted at each sitting.

November 2.

Patient feels much better. Appetite is fairly good. No sickness, headache or diarrhœa—complexion good. Weight, 8 stone 2 lbs. Gums quite healed. Alveolus has not yet sufficiently absorbed to put in artificial teeth. Margins still sharp.

Fig. 30.

Upper jaw, showing Fig. 28 a few months later. All the carious teeth have been removed.

December 3.

Improvement in health maintained. Weight, 8 stone 6 lbs.

January 7, 1897.

The patient is quite well. Weight, 9 stone 6 lbs. Artificial teeth were inserted (Fig. 31.)

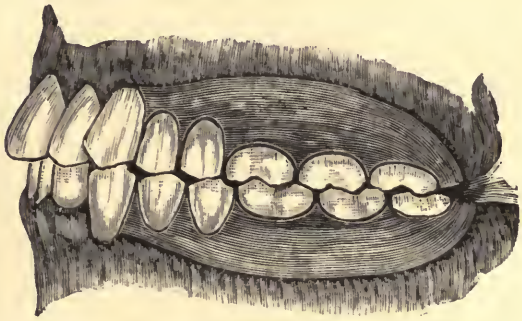


Fig. 31.

Showing Fig. 29. All carious teeth have been removed and replaced by artificial teeth.

The lower incisors or front teeth of the lower jaw are often in a sound condition where caries has otherwise had uninterrupted sway. This would lead to the supposition that the teeth of the upper jaw are more liable to caries than those of the lower jaw. Such liability may be explained by the facts, (1) That the upper jaw is a fixed point, moving only when the head is

moved. (2) The lower jaw is freely moveable both in talking and eating, the lower teeth are therefore more subjected to the friction of food and to the movements of the tongue. (3) The lower front teeth have a greater range of movement and are constantly bathed in saliva from the Sublingual Glands.

Although it is abundantly evident that digestive disturbance is a necessary consequence of imperfect mastication, the above-mentioned cases clearly prove that the presence of carious and necrotic teeth is the main obstacle to good health. Their removal (when they cannot be otherwise treated) is so quickly followed by the passing away of the symptoms recorded, and the return of the patient to a measure of strength and energy is so marked—long before it is advisable to supply artificial teeth in lieu of those extracted—as to make it clear that a *clean and wholesome mouth is a much greater necessity than a masticating machine.*

The following case, which came before the author's notice two days after the above paragraph was written, furnishes further confirmation of the preceding statement:

June 21, 1898.

A gentleman, aged 54, sought advice for his son aged 21. The father stated that twelve years ago he had his own mouth cleared of bad teeth. From the age of 21 to the age of 42 he was in constant misery. He was a martyr to indigestion and suffered from headache and faceache. His upper teeth were so defective that when ever he caught cold his face became greatly swollen. The abscesses would burst beneath the lip, there would be a free discharge of matter into the mouth, and relief would then follow until a fresh swelling appeared. From the time these teeth were removed he has been a "different man," and now enjoys the best of health. He has only 6 lower incisors and eats with comfort *without* artificial teeth.

The presence of carious and necrotic teeth is not only a continuous source of danger to the general health, but may by continuity of tissue promote disease in neighbouring organs. This has been fully emphasized in connection with children, but such inflammation of the mucous membrane of the mouth and throat is by no means rare in adults.

Dr. Green has furnished the notes of the following case.

"A young married woman of the artisan class, who with the inexplicable neglect so common among people of that station in life, had allowed decay to proceed so far in her

mouth without treatment that she, although only 26 years of age had all the molar and bicuspid teeth reduced to carious stumps, while the incisors and canines were more or less carious. This patient came to me with an acute attack of stomatitis, this was followed by tonsillitis, and this in its turn by acute otitis. She made a good recovery, but at one time was certainly seriously ill. I think this is a somewhat striking instance of the extension of disease from neglected carious teeth."

Dr. Roderick Maclaren in his Presidential Address on *Preventive Surgery*, at the Annual meeting of the British Medical Association in Carlisle, 1896*, refers to this subject in the following terms :—

"In the case of teeth it is not sufficiently known how dangerous they are when dead and putrid. Few things exist which are more septic. I have never taken cultures from one, ... but I have often seen the culture experiment in the living body, an experiment convincing enough on the score of activity. I have seen rapid death from general infective disease or putrid thrombosis, with abscesses in the chest or cranium originating in a dead fang. Extensive neck abscesses are no uncommon

* Vide *British Medical Journal*, Aug. 1st., 1896, p. 263.

result from the same source; and in slower forms with feebler infective powers there may be a continuous slight constitutional poisoning with occasional rises of temperature, presenting a singular resemblance to phthisis. In cases of gastric ulcer I have made a practice for some years of examining the teeth, and in every instance have found decayed teeth or stumps in bad condition, or a story of their recent removal."

Summary and Conclusion.

While pointing out the measures to be adopted for the prevention of dental diseases in adult life, their importance has been emphasised by a brief description of dental caries, its progress, complications and treatment.

The disadvantages of the loss of teeth and the subsequent effects upon other teeth have been considered.

The influence of neglected mouths upon the general health has been fully illustrated by individual cases. The cases chosen are typical of what may be found in the every day experience of the Dental Surgeon.